

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 45-59 and 61-84 are pending in the application, with claims 45, 46, 58, 59 and 72 being the independent claims. Claim 72 is sought to be amended. The amendment is believed to introduce no new matter, and its entry is respectfully requested.

It is believed that the amendment presented above will place the application in condition for allowance and/or in better form for appeal. *See* 37 CFR § 1.116(a). Specifically, claim 72 has been amended to make explicit what is intended by the phrase "enhanced transformation ability." Thus, Applicants believe that, in accordance with 37 CFR § 1.116(a), the amendment presented above should be entered after final.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

I. Support for the Amendment to Claim 72

Support for amended claim 72 can be found, *inter alia*, in the specification at page 9, line 15, through page 10, line 5.

II. Oath/Declaration

The Examiner has again acknowledged Applicants' desire to hold the matter of the Oath/Declaration in abeyance. *See* Paper No. 23, page 2. The Examiner, however, stated

that the present Oath/Declaration remains defective for the reasons made of record in the Office Action mailed on April 12, 1999 (paper No. 2). *See* Paper No. 23, page 2. Applicants maintain their request that the matter of the Oath/Declaration be held in abeyance until the remaining issues outstanding in this application are resolved.

III. Claim Objections

The Examiner Objected to claims 70 and 71. *See* Paper No. 23, page 2. According to the Examiner, the word "enhanced" is misspelled in both claims 70 and 71. Applicants note that claims 70 and 71 were amended to correct the misspelling in question in an Amendment and Reply filed on December 5, 2000 (copy enclosed herewith). Since these claim objections have already been fully addressed, Applicants respectfully request that the objections to claims 70 and 71 be withdrawn.

IV. Obviousness-Type Double Patenting

The Examiner has rejected claims 45-59, 61-71 and 81-84 under the judicially-created doctrine of obviousness-type double patenting. *See* Paper No. 23, page 3. Applicants respectfully request that this rejection be held in abeyance until the remaining outstanding issues in this application are resolved.

V. Claim Rejection Under 35 USC § 112, First Paragraph

The Examiner has rejected claims 72 and 80 under 35 USC § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that Applicants had

possession of the claimed invention at the time the application was filed. *See* Paper No. 23, page 4. Applicants respectfully traverse this rejection.

The Examiner has not provided an explanation as to why claim 72 is considered insufficiently described in the specification. For claim 80, however, the Examiner stated that Applicants' disclosure:

is not deemed to be descriptive of the complete structure of a representative number of species encompassed by the claims as one of skill in the art cannot envision all of the spontaneous mutations that increase membrane unsaturated fatty acid content in *E. coli* based on the teachings in the specification.

See Paper No. 23, page 4. Applicants respectfully disagree with this assessment.

Claims 72 and 80 encompass competent *E. coli* that possess a membrane having an increased unsaturated fatty acid content relative to total fatty acid content. Moreover, the *E. coli* of these claims exhibit enhanced transformation ability after storage at a temperature of from about +4°C to about -20°C relative to the transformation ability exhibited by said competent *E. coli* prior to increasing its unsaturated fatty acid content. Claim 80 depends from claim 72 and specifies that said increased unsaturated fatty acid content is caused by genetically selecting for a bacterium having an increased membrane unsaturated fatty acid content. Contrary to the Examiner's assertion, the genus of *E. coli* encompassed by the claims is sufficiently described in the specification to satisfy the requirements under 35 USC § 112, first paragraph.

The written description requirement for a claimed genus can be satisfied, *e.g.*, by sufficient description of a representative number of species by actual reduction to practice, or by disclosure of relevant, identifying characteristics, *i.e.*, structure or other physical

and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of such identifying characteristics, sufficient to show that Applicants were in possession of the claimed genus. *See Regents of the University of California v. Eli Lilly*, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). Applicants assert that the written description requirement is satisfied for claims 72 and 80 because: (1) the specification discloses a representative number of species of the invention, and (2) the specification discloses relevant identifying characteristics of the claimed *E. coli* sufficient to show that Applicants were in possession of the invention.

First, the specification discloses a representative number of species of the invention. That is, a representative number of *E. coli* are described that possess a membrane having an increased unsaturated fatty acid content relative to total fatty acid content and that also exhibit enhanced transformation ability after storage at a temperature of from about +4°C to about -20°C. For example, the specification describes *E. coli* strains that contain an extra copy of the *fubB* gene. Such *E. coli* are shown to possess a membrane having an increased unsaturated fatty acid content and exhibit enhanced transformation ability after storage at a temperature of from about +4°C to about -20°C. *See* specification at page 30, lines 13-21 (Example 10) and at page 46, line 5, through page 51, line 5 (Example 15). The specification also describes an *E. coli* strain (SB3499) which possesses a membrane having an increased unsaturated fatty acid content and that exhibits enhanced transformation ability after storage at a temperature of from about +4°C to about -20°C. The increased unsaturated fatty acid content for SB3499 was achieved by selection. *See* specification at page 16, line 20, through page 19, line 5 (Examples 1-3) and at page 51, line 6, through page 54, line 13 (Example 16). Applicants submit that the specification therefore discloses a representative

number of species of the claimed invention. What constitutes a "representative number" is an inverse function of the skill and knowledge in the art. *See* MPEP § 2163. As discussed below, the composition of *E. coli* membranes, and the genetic/molecular characteristics of *E. coli* that influence membrane composition, are well known in the art. Thus, in view of the high level of skill and knowledge in the art relating to *E. coli* membrane biology, the examples presented in the specification constitute a representative number of species sufficient to show that Applicants were in possession of the claimed *E. coli*.

Second, the specification discloses relevant identifying characteristics of the claimed *E. coli* sufficient to show that Applicants were in possession of the invention. More specifically, the claimed *E. coli* are described in the specification as having "an increased level or amount of one or more fatty acids, preferably unsaturated fatty acids." *See* specification at page 3, lines 9-11. The specification further states that "Examples of unsaturated fatty acids include but are not limited to oleic acid, linoleic acid, linolenic acid, *cis* vaccenic acid, arachidonic acid, palmitoleic acid, etc . . . Preferred fatty acids in accordance with the invention are unsaturated fatty acid, most preferably *cis*-vaccenic acid and palmitoleic acid." *See* specification at page 9, lines 7-12. The specification also teaches that genes which enhance the level of unsaturated fatty acids include *fabB*, *fabF*, *fabD*, *fabG*, *fabA*, *fabH*, *fabI*, *fabZ*, *fadA*, *fadB*, *fadE*, *fadL*, *fadR*, *farR*, and *fatA*. *See* specification at page 14, lines 3-4. The specification also provides a description of the structural and biochemical characteristics of the exemplified *E. coli*. For instance the specification provides details regarding the fatty acid composition of *E. coli* that contain an extra copy of the *fabB* gene. *See* Table 4 on page 49. The specification also provides details regarding the fatty acid composition of strain SB3499. *See* Table 5 on page 52.

Moreover, it is recognized in the art that "*Escherichia coli* has one of the simplest membrane bilayer phospholipid compositions found in nature." *See, e.g.,* de Mendoza, D. and Cronan, J.E., *Trends. Biol. Sci.* 8:49-52 (1983) (document AT5 submitted with the Information Disclosure Statement filed on August 24, 1999) at page 49, right column. In addition, the genetics and biochemistry of *E. coli* membrane lipid composition and synthesis have been studied extensively. *See, e.g.,* Ulrich, A.K. *et al., J. Bacteriol.* 154:221-230 (1983) (document AT21 submitted with the Information Disclosure Statement filed on August 24, 1999) at page 221, right column, and references cited therein (describing a particular enzymatic step in *E. coli* fatty acid synthesis).

Applicants submit that, in view of the molecular, biochemical and genetic information that is known in the art about *E. coli* membrane biology, the specification provides sufficient disclosure of the relevant characteristics of the *E. coli* encompassed by claims 72 and 80.

With respect to claim 80 and the exemplary strain SB3499, the Examiner stated that:

The genetic basis for its increased membrane unsaturated fatty acid content is not discussed or explored. It is unknown whether it bears a single mutation or a multitude of mutations to several different genes. Therefore, the specification does not describe the claimed genus of competent *E. coli* in such full, clear, concise and exact terms so as to indicate that Applicant has possession of these competent *E. coli* at the time of filing the present application.

See Paper No. 23, pages 4-5. Applicants respectfully disagree with the Examiner's conclusion.

Satisfaction of the written description requirement of § 112, first paragraph, does not require that Applicants provide the "genetic basis" for SB3499's increased membrane

unsaturated fatty acid content. The written description requirement can be satisfied by, *inter alia*, disclosure of relevant, identifying characteristics such as structure or other physical and/or chemical properties of the claimed subject matter. *See Eli Lilly*, 119, F.3d at 1568, 43 USPQ2d at 1406. Applicants' specification clearly describes the selection and isolation of strain SB3499. *See* specification at page 16, line 20, through page 17, line 4 (Example 1). The specification also provides a detailed description of the fatty acid composition of SB3499, as well as an analysis of its viability and transformation efficiency characteristics. *See, e.g.*, specification at page 52, Table 5, and at page 18, line 6, through page 19, line 5 (Example 3). Under *Eli Lilly*, this level of physical and chemical detail provided for the disclosed species -- coupled with the information available in the art regarding *E. coli* membrane biology in general -- is sufficient to satisfy the written description requirement for the claimed genus of *E. coli*.

Applicants therefore submit that *E. coli* encompassed by claims 72 and 80 are described in the specification in sufficient detail such that one skilled in the art would recognize that Applicants had possession of the claimed invention. Accordingly, Applicants respectfully request that the rejection of claims 72 and 80 under 35 USC § 112, first paragraph, be reconsidered and withdrawn.

VI. Claim Rejection Under 35 USC § 112, Second Paragraph

The Examiner rejected claims 72-80 under 35 USC § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. *See* Paper No. 23, page 5. Specifically, the

Examiner stated that "[c]laim 72 is vague and indefinite as it [is] unclear what 'enhanced transformation ability' is compared to." *See* Paper No. 23, page 5.

Although Applicants respectfully disagree with the assertion that claims 72-80 are indefinite, Applicants have nonetheless amended claim 72 to read: ". . . wherein said competent *E. coli* exhibits enhanced transformation ability after storage at a temperature of from about +4°C to about -20°C relative to the transformation ability exhibited by said competent *E. coli* prior to increasing its unsaturated fatty acid content." In view of the amendment to claim 72, Applicants respectfully submit that the Examiner's rejection of claims 72-80 under 35 USC § 112, second paragraph, is fully accommodated and should be withdrawn.

VII. Claim Rejection Under 35 USC § 102

The Examiner has rejected claims 72, 76 and 77 under 35 USC § 102(b) as allegedly being anticipated by Bogoslovakaia *et al.*, *Epidemiol. Immunobiol.* 12:65-68 (1984) ("Bogoslovakaia"). *See* Paper No. 23, page 5. According to the Examiner, "Bogoslovakaia *et al* teach *E. coli* having an increased unsaturated fatty acid content relative to total fatty acid content." *See* Paper No. 23, page 6. In support of the assertion that claims 72, 76 and 77 are anticipated by Bogoslovakaia, the Examiner pointed to the abstract and the table on page 66 of the reference. Applicants disagree with the Examiner's conclusion and respectfully traverse this rejection.

An anticipation rejection under 35 USC § 102 requires a showing that each limitation of a claim must be found in a single reference, practice, or device. *See In re Donohue*, 766

F.2d 531, 226 USPQ 619, 621 (Fed. Cir. 1985). Bogoslovakaia does not anticipate claims 72, 76 and 77 because it does not teach or suggest all of the elements of the claims.

Applicants note that Claims 72, 76 and 77 are directed to *competent E. coli*. There is no apparent indication that the *E. coli* disclosed in Bogoslovakaia are competent. Thus, Bogoslovakaia does not teach or suggest *E. coli* having all of the characteristics of the *E. coli* that are encompassed by claims 72, 76 and 77. Accordingly, Applicants respectfully request that the rejection of these claims under 35 USC § 102(b) be reconsidered and withdrawn.

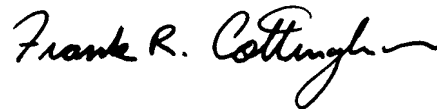
Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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Version with markings to show changes made

72. (Once amended) A competent *E. coli* possessing a membrane having an increased unsaturated fatty acid content relative to total fatty acid content, wherein said competent *E. coli* exhibits enhanced transformation ability after storage at a temperature of from about +4°C to about -20°C relative to the transformation ability exhibited by said competent *E. coli* prior to increasing its unsaturated fatty acid content.